

## **1. Amendments to the Claims:**

A listing of the entire set of pending claims (including amendments to the claims, if any) is submitted herewith per 37 CFR § 1.121. This listing of claims will replace all prior versions, and listings, of claims in the application.

### **Listing of Claims:**

1. (Currently amended) ~~In~~ A method for correcting impairments on information, passing through an information transmission system, comprising imposed by a plurality of defective elements of the information transmission system for generating, transporting, and receiving the information, wherein some elements are defective and impose impairments on the information passing therethrough, a method for correcting said impairments, comprising:

a) identifying the defective elements imposing impairments on the information and characterizing ~~the each~~ defect ~~of each, including by~~ performing a frequency analysis of each defective element;

b) determining ~~a correction characteristic corresponding to each defective element, and creating~~ a frequency characteristic complementary to said frequency analysis, such that ~~the a~~ combination of said frequency analysis and said complementary frequency characteristic ~~along with the correction characteristic~~, when applied to information passing through said element, corrects the impairment imposed by said element; and

e) creating a composite, two channel I and Q finite impulse response filter, having I-I and Q-Q direct components and I-Q and Q-I cross components, by combining said correction complementary frequency characteristics, ~~and performing an inverse discrete Fourier transform of said complementary characteristic; and g) positioning,~~ said filter being positioned in said information transmission system for correcting said impairments imposed on the information by said defective elements.

2. (Currently amended) ~~An information transmission system, as in~~ The method of claim 1, wherein said system is ~~limited to~~ a data receiver ~~whose~~ and said plurality of elements include an IF filter, a two-channel down-converter, and I and Q data processing channels.

3. (Currently amended) ~~An information transmission system, as in~~ The method of claim 1, wherein said system is ~~limited to~~ a data generator ~~whose~~ and said plurality of elements include I and Q data channels, a two-channel up-converting modulator, and an IF filter.

4. (Canceled)

5. (Currently amended) ~~An information transmission system, as in~~ The method of claim 1, wherein:

~~i. step (c) further~~ creating a composite, two channel I and Q finite impulse response filter includes arranging said direct and said cross components as terms of a set of 2x2 matrices; ~~and~~

~~——— ii. step (d) further includes arranging said single correction characteristic as terms of a set of 2x2 matrices.~~

6. (Currently amended) A generalized digital filter for filtering two-component signal information of a receiver comprising a plurality of receiver elements, the filter comprising:

a) a dual input port, having an I input for a signal  $x_I$  and a Q input for a signal  $x_Q$ , wherein  $x_I$  and  $x_Q$  are components of a two-component input signal  $x$ ;

b) a dual output port, having an I output for a signal  $y_I$  and a Q output for a signal  $y_Q$ , wherein  $y_I$  and  $y_Q$  are components of a two-component output signal  $y$ ;

e) a first signal path, characterized by a first impulse response, having an input

coupled to the I input port and a first output;

Ⓔ) a second signal path, characterized by a second impulse response, having an input coupled to the Q input port and a second output;

Ⓕ) a third signal path, characterized by a third impulse response, having an input coupled to the I input port and a third output;

Ⓖ) a fourth signal path, characterized by a fourth impulse response, having an input coupled to the Q input port and a fourth output;

~~g) summing means~~ a first adder for adding said first and second outputs and for coupling the sum thereof to said I output; and

~~h) summing means~~ a second adder for adding said third and fourth outputs and for coupling the sum thereof to said Q output,

wherein said first, second, third and fourth impulse responses provide frequency compensation for impairments imposed by a plurality of defective elements among the plurality of receiver elements.

7. (Currently amended) ~~A~~ The generalized digital filter, as in claim 6, wherein said first, second, third, and fourth impulse responses are independent of one another.

8. (Currently amended) ~~A~~ The generalized digital filter, as in claim 7, wherein said first, second, third, and fourth impulse responses are further constrained to have finite lengths.

9. (Currently amended) ~~A~~ The generalized digital filter, as in claim 8, wherein said first, second, third, and fourth impulse responses are further constrained to have equal lengths.

10. (Currently amended) ~~A~~ The A generalized digital filter, as in claim 6, wherein said first, second, third, and fourth signal paths are realized by finite impulse-response filters.

11. (Currently amended) A The generalized digital filter, as in claim 10, wherein each of said finite impulse-response filters is independently characterized.

12. (Previously Presented) In applying a generalized two-channel digital filter to process an input data stream  $x$  and to produce an output data stream  $y$ , wherein both  $x$  and  $y$  are two-component signals  $x_I$ ,  $x_Q$ ,  $y_I$ , and  $y_Q$  which are processed in blocks of  $N/2$  data values long,  $N$  being a power of 2, and wherein the filter is characterized by four independent impulse response vectors  $h_{11}$ ,  $h_{12}$ ,  $h_{21}$ , and  $h_{22}$ , each vector of length  $N/2$ , a method for efficiently computing said output data stream  $y$ , comprising the preliminary steps of:

a) forming the vectors

$$a = \frac{(h_{11} + h_{22}) + j(h_{21} - h_{12})}{2} \quad \text{and} \quad b = \frac{(h_{11} - h_{22}) + j(h_{21} + h_{12})}{2}$$

b) appending  $N/2$  zeros to each vector and performing an FFT on each vector to produce  $A_k$  and  $B_k$ , respectively; and, for each block of  $N/2$  data values in said input data stream  $x$ , additionally comprising the iterative steps of:

c) moving the previous block of input data values to the first half of an input vector  $x_N$  of length  $N$  and loading the current block of input data values into the second half of said input vector  $x_N$ ;

d) treating  $x_N$  as a vector of complex numbers of the form  $x_I + jx_Q$ , and performing a  $N$ -point FFT to produce  $X_k$ ;

e) computing the complex vector  $Y_k = A_k X_k + B_k X_{N-k}$ ,  $0 \leq k < N/2$ , and performing an inverse FFT on the result to produce the complex vector  $y_n$ ;

f) designating the second half of  $y_n$  as the  $N/2$  output samples of the current iteration, according to  $y_{In} = \text{Real}(y_Q)$ ,  $y_n = \text{Imag}(y_n)$ , where  $N/2 \leq n < N$ ; and

g) returning to step (c) for the next block of  $N/2$  data values.